THE UNIVERSITY OF ALBERTA

THE RELATIONSHIP BETWEEN ABSTRACT ABILITY AND ADEQUACY OF DRAWING THE HUMAN FIGURE

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "The Relationship Between Abstract Ability and Adequacy of Drawing the Human Figure", submitted by Vivian Darroch Renner in partial fulfilment of the requirements for the degree of Master of Arts.

ABSTRACT

This study investigated the relationship between a verbal measure of abstraction and scores that would indicate adequacy of human figure drawings.

The measure of abstraction employed was the WAIS Similarities test and the drawings were scored by the Buck method for details, proportion and perspective, as well as judged globally for "stereotypy". The subjects were 70 Grade XII boys who were divided into high or low abstract groups based on their scores on the Similarities test. The two groups were matched on intelligence. A factor analysis of all scores was done on the data.

No relationship between level of abstraction and drawing scores emerged. Nevertheless, the proportion of drawings judged as stereotyped in the two groups was significantly different from each other. The concrete group drew more stereotyped drawings.

Two factors were tentatively interpreted. One, the common factor, was suggested to be a dimension of drawing ability in conjunction with a dimension of broad psychological adjustment. The second, not named, was interpreted to suggest that persons with simple verbal concepts force their drawings of human figures to conform to "stereotypes".

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CHAPTER I

INTRODUCTION

The results of many empirical studies dealing with the drawing process indicate that cognitive factors, especially the process of concept formation, appear to be crucial in drawing (Brown, 1958; Carmichael, Hogan and Walter, 1932; Gibson, 1929; Goodenough, 1926). Changes appear which are associated with age and mental level (Campbell, in Harris, 1963; Rey, in Harris, 1963; Townsend, 1951) and a close relationship seems to be apparent between concept formation as shown in drawing and general intelligence (Harris, 1963). Indeed, it is usually with these variables, age and mental level or intelligence, that the interaction between concept formation and drawing process is illustrated.

The purpose of this thesis is to investigate how a measure of concept formation *per se* is related to performance in drawings of human figures, when general intelligence level is held constant. The measure of concept formation will be a verbal one. If a conclusive relationship between a verbal measure of abstraction and drawing scores is established, diagnosticians could use the human figure drawing test as a measure of concept formation when for some reason (for example, presence of illiteracy, cultural differences, or muteness) administration of a verbal test is not practical.

Concept Formation

The primary assumption underlying the term concept formation as it is used in this thesis, is that there is movement from initial perceptual experience with undifferentiatedness of details and relative globality of parts to increasing differentiation of details and integration of parts as concepts develop culminating in verbal symbolism of that integration.

There are numerous theories which attempt to explain the development of the ability to form concepts. For the purposes here, Scheerer's (1959) paradigm which describes the stages leading from perception to abstract thinking may be considered as representative of the development of concept formation. Later, it will be seen that his theory is compatible with Goodenough's (1926) psychology of drawing theory which assumes organization in drawings is given by experience, that is, behaviour is organized in terms of the organism's repeated contacts with its environment.

Scheerer's basic premise is that both perception and thinking are cognitive and that both ultimately refer to invariant functional relationships. That is, they differ in the manner in which both are codified and realized in experience; yet, both are representational and they are on the same continuum with a number of intermediary stages of different forms of unit formation at each stage. Scheerer postulates five stages. The first stage is primitive. The ego and the world are still undifferentiated from each other. The psychological

units which develop are perceptual, subjective representations derived from affective impressions where the object is assimilated in terms of a sensory-affective schema. With greater differentiation of the ego and world, the object is assimilated via perceptual schemata. That is, in the second stage, the psychological units are derived from a "figure-ground" perception and they represent invariant, preferred gestalt relations, but no particular elements. The function of these schemata is to establish the phenomenon of constancy and to allow for experience of sameness over a certain range. In the third stage, the object is assimilated in terms of a sphere of meaning. This sphere represents a realm of meanings which have become connected by being appropriately paired in a variety of situations in the past. Though assimilation via spheres is broader than the preceding stage, the units only represent pre-concepts because each sphere still contains different contents. Spheres of meaning are largely functional definitions derived from action situations and, generally, occur with an emotional investment. At the fourth level, the object is assimilated in terms of a conception which represents an idea between the above experiences and a word meaning. The unit represents an idea about a relationship, but because the perceptual schema is still not adequately conceptualized, the idea may not be differentiated from the properties of other more closely related ones. The fifth stage, the level of abstraction is based on "deliberate construction of invariant relationships between objects thought of, or ideas ... underlying similarities are isolated as the invariant, while

simultaneously changing aspects of the objects are recognized. ... Objects may be now perceived as representative of a class and not merely assimilated through schemata, spheres of meaning, or conceptions. On this level, language can create conceptual symbols ... and produce new ones ... which become increasingly dissimilar from what they signify" (Scheerer, 1959).

In development, the child goes through countless stages of assimilative representations between perception and the formal concept formation, and in the adult these stages continue to play a role. In fact, cognitive theorists have formulated a distinction between abstract and concrete behavioural levels (Goldstein and Scheerer, 1941). To employ abstract thinking allows detachment of the self from direct outer and inner experience ... from the demand qualities of the phenomenal objects and from the immediate thought qualities. In other words, when thought depends more directly on assimilation of new experience through spheres of meaning and through levels of abstraction, it allows individuals to refer to already formed concepts in their effort to make a more meaningful response. This detachment also allows further formation of concepts. For abstract thinkers, concepts form, change, enlarge, or sub-divide by a feed-back process wherein the idea is continually tested and modified accordingly (Brown, 1958). In this context, the unfamiliar stimulus is assigned by them to a familiar concept in terms of salient elements or properties. Conversely, concrete thinking does not so readily allow detachment

of the self from experience because the thinking of concrete persons depends more frequently on the primitive stages of assimilation (for example, perceptual schemata). Such processes do not allow the formation of many or broad concepts. As a result there are fewer expectancies to which new perceptions may be referred and the responses of concrete thinkers, therefore, will not always be so meaningful.

Essentially, then, concept formation will be conceived as "... the function which informs the human being about the 'belonging together' of the objects and the events in his everyday world" (Rapaport, 1947, Vol. I, p. 147). It will be operationally defined as the ability to discriminate and recognize particular objects and to group objects into classes according to recognized similarities. It will be assessed by the Similarites sub-test of the Wechsler Adult Intelligence Scale (Wechsler, 1958).

The Similarities test is composed of a list of thirteen paired words placed in an established order of difficulty (see Appendix A). With each pair the subject is required to state a way in which they are alike. Success on this scale depends on the individual's ability to recognize common elements of the items about which he is asked and to bring them together under a single concept. The individual may form concepts on a concrete, functional, or abstract basis. Scoring distinguishes between the different types of responses by allowing different credits for each. The higher score indicates a better capacity

for abstraction.

Taking concept formation as it has been conceptually defined above, implies that all thought processes have concept formation as an aspect of them (Rapaport, 1947). With the development of conscious thinking, however, affective conceptual organizations are replaced by verbal, abstract ones, common to the social group. Still, some idiosyncratic origins of conceptualization remain and Rapaport (1947, Vol. I, p. 148) describes how qualitatively different levels of concept formation will emerge in the responses on the Similarities test.[1]

He uses an example taken from Similarities sub-test, the pair dog - lion. He says that subjects who think entirely concretely or who may be threatened by the physiognomic qualities of the lion may refuse to even answer the question. If they are not so extreme their response will give the similarity in that both have legs, or tails, or hair. Here, it is relatively unessential details which are taken as the content of the realm for in such a response other concrete features of dogs overlooked; but for practical purposes the response is over-inclusive; - for example tables too have legs, and humans have hair. Another way to define the similarity is to say that a dog and a lion are both animals. This is an abstract level of concept formation for

1. The pairs of objects whose similarity must be conceived are considered by Rapaport to constitute a conceptual realm, the conceptual content of which must be discovered and stated. He defines "realm" as the objects to which the concept pertains and "content" is what all the objects of the "realm" have in common (Rapaport, 1947, Vol. I, p. 148).

it subsumes items of the realm in question under a general term which is common to our thinking. At times a definition will refer to the function of objects, but these definitions are usually only partial and not exhaustive. For example, with the pair axe - saw, the similarity may be assimilated as "they both cut". More general characteristics are not taken into consideration by such a definition.

In summary, it is emphasized the Similarities sub-test[1] refers to verbal concepts and can be responded to on several levels of conceptualization. This is compatible with the agreement of most cognitive theorists that different individuals finally develop different levels of concept formation.

Concept Formation and Drawing

Goodenough (1926) first described in detail the genesis of children's drawings. She concluded that to construct drawings requires the hypothesizing of higher thought processes, which involve discriminations, associations, and generalizations of details and relations. She stated that analysis and abstraction are clearly involved, but that only the final result is present in consciousness. "In order to represent objects by means of pictures there must be, however, a conscious analysis of the process, of the intermediate steps by means of which the desired result is to be obtained. It is necessary to select from the total impression those elements which

1. The reliability coefficient for the sub-test is 0.87 (Wechsler, 1958, p. 103).

appear to be characteristic or essential. This analysis must be followed or accompanied by observations of relationships. The relationships to be observed are of two kinds, quantitative and spatial. The former determine proportion, the latter the position of various parts of the drawing with reference to each other" (Goodenough, 1926, pp. 73-74). The process of concept formation involved in the drawing process may be classified as follows (Goodenough, 1926, pp. 78-79): association by similarity, where the individual sees a series of lines on the paper and the concrete object represented by them; analysis into component parts of the object to be drawn; evaluation of these parts and selection of those which are characteristic and essential; analysis of spatial relationships, of position; judgements of quantitative relationships, of proportion; through further process of abstraction reproduction of the above into graphic outlines and capacity to adjust the drawing scheme as the concept develops.

Considered as a whole, this process is quite analogous to Scheerer's paradigm of concept formation and to the rationale for the Similarities Test.

Buck (1948) has suggested that his scoring method for the refined differentiation and higher organization of drawings expresses the quality of concept formation in them. It is his House-Tree-Person scoring applied to human figure drawings that shall be followed in this study. To this writer's knowledge only one study in the literature

(Digiammo & Ebinger, 1961) relates H-T-P scores to verbal measures of abstraction although the findings can not be considered conclusive due to methodological inadequacies.[1] Digiammo and Ebinger (1961) did, however, obtain significant positive correlations between good capacity for abstraction and H-T-P drawing scores.

Statement of the Hypothesis

In drawing human figures, persons must usually employ images of others. Both abstract and concrete thinkers presumably have the same experience in perception of persons, but the organization and subsequent representation of the perceptions by each group should be different regardless of intelligence level for the expressive capacity of the total personality is a function of conceptual capacity (Goldstein, in Kasinin, 1939). The primary aim of this thesis is to investigate, when intelligence[2] is held constant, whether abstract thinkers do represent images of persons more correctly in terms of selection of characteristic details, analysis of spatial relationships and judgements of quantitative relationships, all of which are the traditional ways of considering and measuring the drawing. It is hypothesized that they will do better because not only will they be able to recognize the various "parts" of what they must represent but they will have the ability to

1. Digiammo and Ebinger (1961) worked with a small psychiatric population (N=30) where the ages ranged from 15 to 60 years. The statistical method employed was the Spearman rank order correlation.

2. For the purposes of this study intelligence will refer to performance on achievement tests and will be defined as a very "general mental ability", "general scholastic ability".

consider the consequences and implications of presenting the image with or without changes so that it symbolizes what is required by the directive.

Another aim of this thesis is to see if there is a difference between the two groups when the drawing is judged "globally" or, as a whole. Persons who employ abstract thinking will be able to utulize a larger repertoire of interrelated "mental images" of persons in response to the directive "draw a man", for they will have access to combinations of percepts of many men which, now, involve conceptual activity. For example, with their perception of persons X, Y, and Z they will discriminate particular aspects and group these aspects and persons into classes according to recognized similarities. That is, person X is like, or is similar to person Y, etc. and they will ultimately detach themselves from any particular phenomenological experience with one image and resolve their many experiences into one conceptual (abstract) representation of a "man". The persons who employ concrete thinking and who are, therefore, more dependent on perceptual elements may literally respond to the immediate thought qualities of an experienced image and will not be able to liken parts or aspects of people to each other so well for they will not be able to detach themselves from some particular image which has affective meaning for them. It is hypothesized drawings of the abstract thinker will synthesize images of aspects or characteristics of men so that their drawings should be more representative of an "average" man.

An "average" man is defined, here, as one whose general manner, appearance, clothing, accessories, etc. are not associated with a distinct cultural group (e.g: beatnik) or occupation (e.g.: policeman, cowboy) in this society. Implicit in this definition is that the abstract thinker can take images of men from all walks of life, disregard their unique features and represent them all in a composite picture. The compositions of the concrete group will more likely represent what will be called here, a "sterotyped" man. A "stereotyped" man is defined, here, as one whose general manner, appearance, clothing, etc. are associated with a distinct cultural group or occupation in this society[1]. Implicit here is that the concrete thinker is representing a particular image in its entirety and without considering the relationship of this to the more general directive "draw a man".

More specifically, with subjects who are divided into an Abstract (A) group and a Concrete (C) group on the basis of their performance on the Similarities sub-test of the WAIS, and who are matched on intellectual level, age and sex, and whose human figure drawings are scored by the H-T-P method as applied to persons, it is predicted that:

1. the capacity for abstract thinking will allow the A group, when compared with the C group, to exhibit in their drawings a greater

1. A drawing of a "stereotyped" man that is readily recognizable is actually an abstractive feat but to use it in response to the general directive "draw a man" is probably not to create an abstraction so much as it is to borrow one that has previously been created by someone else.

number and better quality of details, an increase in the recognition of elements of proportion, and an increase in the elements of perspective points;

2. a higher proportion of the drawings of the A group, when they are judged in terms of "global" quality will express a fairly "average" figure while the drawings of the C group will express a higher proportion of a "stereotyped" man.

CHAPTER II

METHOD

Measurements

The criterion measure for capacity to abstract was the Similarities sub-test of the Wechsler Adult Intelligence Scale (Wechsler, 1958) and the drawings were scored via the H-T-P method for the human figure drawings as it is described in the qualitative and quantitative manual for the H-T-P Method (Buck, 1948).

Description and Rationale of the Scoring for the H-T-P Method as Applied to Human Figure Drawings - There are thirty-two[1] items which are scored on the human figure drawings by Buck's method[2] (see Appendix B). These items may be subsumed under more general categories of Details, or Proportion, or Perspective. Buck (1948) found that these latter categories of detail, proportion, and perspective appeared to differentiate best between subjects of various intellectual levels and, therefore, he assumes as do others that scores on these items reflected a quality of concept formation. This is in accord with Goodenough's observations that as the child matures he shows increased recognition and representation of details, proportion and, finally, their

1. Buck's item #332 was omitted in the scoring because it required post drawing comments from Ss and none were obtained here.

2. Buck's H-T-P method was chosen over other methods which are, perhaps, more popular because his method allows for achieving not only "good" scores but for obtaining "flaw" scores as well.

spatial relationships.

Buck defined detail as "any discrete, identifiable part of a whole; for example, the arm of a person". By proportion he meant "(1) the size (that is, the height, width, or area) of one detail in relation to the size of another detail ... for instance, the length of an arm in relation to the length of a trunk of a person; or (2) the ratio of height to width in a given detail; to illustrate, the ratio of the width to the length of the nose of a person". By perspective Buck referred to three things ... "(1) the placement or presentation of one or more of the details in a given whole; for example, the arm with elbow flexed; ... (2) the presentation of a given whole; as ... a person with the feet cut off by the page's lower edge" (Buck, 1948, pp. 7-8). After identification of the above categories Buck segregated the items according to "good" or "flaw". A "good" score was arbitrarily defined as an item which had been used by 50% or more of the subjects of the standardization groups from the borderline level of intelligence upward through the superior level and by less than 50% of the subjects of any group below the borderline level; a "flaw" item was one which had been used by 50% or more of the subjects of groups of less than borderline intelligence and by less than 50% of the subjects of all groups from the borderline level upward. By similar methods, Buck established what he called "factor symbols" to represent within each category intelligence level so that D3, D2, and D1 were "flaw" scores representing very inferior, imbecile, and

moron levels, while A1, A2, A3, S1 and S2 were "good" scores representing borderline (A1) through average (A3) to superior (S2) ratings.

In summary then, his scale had three categories - detail, proportion and perspective. Within each category one could obtain good and/or flaw scores. As well, for each individual item one could obtain a factor symbol or not which represented intelligence and, therefore, presumably concept formation.

Buck claims validity of the method as a whole for measuring intelligence has been established through clinical procedures such as correlational techniques although he admits the individual differential items are less well-established than are the total scores for each category. He could not offer figures for reliability. On the basis of correlations Harold (1954) in a quantitative study relating the H-T-P method to the Wechsler Bellevue Scale has concluded that the H-T-P method is a valid measure of intelligence and Digiammo and Ebinger (1961) have found significant positive correlations between H-T-P scores and a verbal measure of abstraction. Breliauskas (1956), investigating scorer reliability with three judges on the drawings, has indicated that correlations are lower than acceptable for individual prediction but sufficient for group prediction.

Subjects - Seventy male high school students in Grade XII formed the final subject group. According to their performance on

the Similarities test they were placed in either the A group (N=35) or the C group (N=35). All subjects in the A group had obtained a weighted score of 16 or above on the Similarities test (range = 16 - 20, median = 17.06) and all the subjects in the C group had obtained a weighted score of 12 or less (range = 4 - 12, median = 10.96).[1] Subjects between groups were matched on intellectual level (see appendix C) as determined by school records.[2] The median intelligence quotient of the A group was 115 (range = 95 - 124) and the corresponding median of the C group was 113 (range = 95 - 128).[3]

Administration and Scoring of the Test - Materials required for the testing were printed copies of the WAIS Similarities Test and one HB pencil and one piece of blank white bond (approximately 8 1/2 x 11 inches) for the drawing. Administration took place in school classrooms with approximately 30 subjects at a time. Part I (see Appendix

1. According to Wechsler (1958) a difference of three in weighted scores is a significant difference.

2. The intellectual ratings were based on students' rating two years previously in Grade X on the Otis Mental Ability Test (group). This test consists of items including analogies, vocabulary, verbal opposites, disarranged sentences, reasoning, proverbs, arithmetic problems, geometric figures, and so forth. (See Anastasi, Anne, in Psychological Testing, The MacMillan Company, 1964, pp. 217-221).

3. The original subject pool was composed of 154 students. Of these, seventy-one obtained weighted scores between 16 and 10 on the test for abstraction and were automatically eliminated as not satisfying the cut-off criteria. Of the remaining eighty-three, eight could not be used for their drawings were non-scorable by the Buck method (for example, they drew only a head) and five who were in the A group obtained intelligence quotients in such a superior range they could not be matched with subjects in the C group.

D) of the procedure was to complete the Similarities test. Part II (see Appendix E) was to complete the drawing. If, in this part of the procedure a subject asked questions such as "The whole person? What kind of person?" the examiner simply responded privately to him "Draw whatever you like in whatever way you like, etc." A third task (see Appendix E) was given to the subjects in order that they would remain occupied until the end of the experimental session but this task had no function other than that in the study.

The Similarities tests were scored by the examiner according to the WAIS manual (1955). All measurements on the drawings were done by three other judges who were graduate students in psychology. One judge had moderate experience with the drawing test, the second had little knowledge of it, and the third had no experience with it. All judges were trained and practiced the scoring system on a few drawings before they commenced actual judging on the data. Judgements were blind, in that the judges did not know to which group the drawings belonged. Judgements were made independently and upon completion if scores given to items did not agree they were submitted to discussion so that at least two of the three judgements were the same.[1] At all times scoring followed the procedure outlined by Buck in the H-T-P method.

1. No reliability coefficient was calculated as, but it would seem that Breliauskas (1956) conclusions held, for of the thirty-two items there would be an average of perhaps, 3 or 4 per drawing in which all judges did not agree.

The judgement of stereotypy was based on the consideration of the drawing globally - as a whole image. If a positive judgement was made the stereotype was named (for example, cowboy, policeman, etc.). A stereotype judgement was not accepted if all three judges had not independently judged it so. There was only one case where their judgements did not match.

CHAPTER III

STATISTICAL METHODS AND RESULTS

Statistical Procedures Used - After each subject's drawing had been judged and scores had been assigned in the various "good" and "flaw" categories a consolidated score for each of the three categories of variables was obtained for each subject by subtracting his total "flaw" scores from his total "good" scores. For the items of Details, Proportion, and Perspective the consolidated scores of all subjects were submitted to a series of "t" tests (Edwards, 1960) to investigate the difference between the means for each group.

Using a test (Edwards, 1960, p. 51) for the significance of the difference between two proportions, the relative number of stereotyped drawings in each group was also investigated.

In order to investigate structure, the drawing scores, the Similarities scores, the intelligence quotient and the presence or absence of stereotypy for each subject were submitted to a principal axis factor analysis (Fruchter, 1954).

Results

Tables 1 and 2 summarize the item scores obtained for each of the subjects in the Abstract and Concrete groups[1] as well as their

1. Appendix F includes drawings which were considered to be stereotyped and which were not. It also includes drawings which obtained high scores and low scores.

TABLE 1

INDIVIDUAL ITEM SCORES FOR SUBJECTS IN THE ABSTRACT GROUP ON DRAWINGS, INTELLIGENCE (I.Q.), SIMILARITIES SUB-TEST (SIM.) AND STEREOTYPY (STR.)

Sub.	Details								Proportion								Perspective								I.Q.	Sim.	Str.
	D_3	D_2	D_1	A_1	A_2	A_3	S_1	S_2	D_3	D_2	D_1	A_1	A_2	A_3	S_1	S_2	D_3	D_2	D_1	A_1	A_2	P_3	S_1	S_2			
1	0	1	0	5	1	5	1	0	0	0	0	0	6	0	1	2	0	0	0	1	0	2	2	0	123	16	0
2	0	1	0	5	2	3	1	0	0	0	0	2	3	1	0	0	0	0	1	0	0	2	2	0	115	16	1
3	0	1	0	3	2	5	0	0	0	0	0	0	3	2	1	0	0	0	2	0	0	2	0	1	124	18	0
4	0	0	1	4	1	5	0	0	0	0	0	1	4	1	0	0	0	0	1	0	0	3	1	0	105	17	0
5	0	0	0	5	1	5	1	1	0	0	0	2	3	2	0	0	0	0	1	0	0	1	1	0	106	16	1
6	1	1	1	4	2	4	1	1	0	0	0	2	4	1	0	0	0	0	1	0	0	2	2	0	119	18	0
7	0	1	1	5	1	2	1	0	0	2	0	2	2	0	0	0	0	0	1	0	0	2	2	0	126	18	1
8	0	0	1	3	1	5	2	0	0	1	1	0	2	2	1	0	0	1	0	0	0	2	1	0	118	20	0
9	0	1	0	4	3	4	1	0	0	0	0	1	4	1	1	0	0	0	0	0	0	3	1	0	103	17	0
10	0	2	2	4	1	2	0	0	0	3	1	1	1	0	0	0	0	0	0	0	1	2	2	0	120	15	1
11	1	1	0	4	3	1	0	1	0	0	1	0	4	1	0	0	0	0	0	0	2	2	0	0	121	16	1
12	0	0	1	5	3	1	1	0	0	1	1	0	2	2	1	0	0	0	1	1	1	0	0	0	119	19	0
13	0	0	0	1	1	1	2	0	0	2	0	2	3	1	0	0	0	0	1	1	0	2	0	0	121	17	0
14	0	0	0	4	3	5	1	0	0	0	0	1	2	2	1	0	0	0	0	0	0	2	1	0	121	20	0
15	0	4	1	2	1	2	1	0	0	2	1	2	1	0	0	0	0	0	0	1	1	1	0	0	117	17	1
16	0	0	1	5	1	5	2	0	0	0	0	2	5	2	0	0	0	0	1	0	1	2	1	0	120	17	0
17	0	0	2	3	2	5	1	0	0	0	0	2	4	1	0	0	0	0	2	0	2	2	1	0	121	15	0
18	0	0	2	4	1	2	1	0	0	1	1	2	3	0	0	0	0	0	4	0	0	1	1	0	115	15	1
19	0	0	1	4	1	5	3	0	0	0	0	0	4	2	1	0	0	0	0	0	0	2	1	0	110	15	0
20	0	0	4	3	4	1	0	0	0	0	0	2	3	2	0	0	0	0	1	0	0	2	0	1	119	20	0
21	0	1	2	4	1	2	1	0	0	0	1	1	3	2	0	0	0	0	0	1	0	1	1	0	112	18	0
22	0	0	1	4	2	5	0	1	0	0	0	0	5	1	1	0	0	0	1	0	0	2	1	0	116	19	0
23	1	1	1	5	0	0	2	0	0	0	1	1	3	1	0	0	0	0	2	2	1	0	0	0	114	16	0
24	0	0	0	6	1	5	1	0	0	0	0	1	5	1	0	0	0	0	1	1	0	2	2	0	115	16	0
25	0	0	0	5	1	5	0	0	0	0	0	2	4	1	0	0	0	1	0	0	0	3	1	0	114	17	0
26	0	0	2	4	1	2	0	0	0	0	0	1	2	1	1	0	0	0	0	0	1	2	0	0	115	18	0
27	0	0	2	3	1	2	0	0	0	0	0	1	2	2	1	0	0	0	1	0	0	2	1	0	112	17	0
28	0	0	0	5	3	3	1	1	0	0	0	2	4	2	0	0	0	0	0	0	0	3	1	0	99	17	0
29	0	0	0	4	1	5	2	1	0	0	0	1	4	1	1	0	0	0	0	1	0	2	2	0	116	17	0
30	0	0	0	5	2	6	0	0	0	0	0	0	5	1	1	0	0	0	0	0	0	1	1	0	118	18	0
31	0	0	0	4	1	3	1	0	0	1	1	0	3	0	1	0	0	0	0	1	0	2	0	0	111	19	0
32	0	0	1	6	1	4	0	0	0	1	1	1	2	0	1	0	0	0	0	1	0	1	2	0	117	16	0
33	1	3	1	4	0	1	3	0	0	0	0	1	2	3	1	0	0	0	1	0	0	2	1	0	95	16	1
34	3	3	3	1	0	1	1	0	0	0	2	1	2	1	0	0	0	0	5	1	0	2	2	0	118	15	0
35	0	0	4	2	2	2	1	0	0	2	0	2	3	0	0	0	0	0	1	1	0	1	0	0	119	18	0
Mean	0·20	0·51	1·11	4·0	1·49	3·46	0·97	0·17	0·0	0·45	0·34	1·06	3·11	1·23	0·43	0·0	0·0	0·08	0·83	0·37	0·31	1·80	1·00	0·0			
S.D.	0·53	0·99	1·71	1·20	1·81	1·73	0·81	0·38	0·0	0·81	1·53	0·79	1·17	0·83	0·50	0·0	0·0	0·25	1·11	0·59	0·57	0·71	0·72	0·0			
Sum	7	21	37	105	52	121	34	6	0	16	13	37	109	43	15	0	0	2	29	15	11	63	35	0			

TABLE 2

INDIVIDUAL ITEM SCORES FOR SUBJECTS IN THE CONCRETE GROUP ON DRAWINGS, INTELLIGENCE (I.Q.), SIMILARITIES SUB—TEST (SIM.) AND STEREOTYPY (STR.)

Sub.	Details								Proportion								Perspective								I.Q.	Sim.	Str.
	D_2	D_3	D_1	A_1	A_2	A_3	S_1	S_2	D_2	D_3	D_1	A_1	A_2	A_3	S_1	S_2	D_2	D_3	D_1	A_1	A_2	A_3	S_1	S_2			
1	0	0	1	2	1	0	1	0	0	0	0	0	4	3	1	0	0	0	1	0	1	1	0	0	122	11	
2	0	0	1	3	1	2	1	0	0	1	0	1	1	1	1	0	0	0	0	0	1	2	0	0	112	11	0
3	0	0	1	1	2	2	0	0	0	2	0	1	2	0	1	0	0	1	2	3	0	0	0	0	125	17	0
4	0	0	1	0	2	2	1	0	0	3	2	1	2	0	0	0	0	0	1	0	0	2	1	0	100	11	1
5	0	1	1	0	1	2	1	0	0	0	0	2	2	2	0	0	0	0	0	0	1	2	0	0	105	12	
6	0	0	0	3	2	3	1	0	0	0	0	1	3	1	1	0	0	1	0	1	0	1	1	0	117	12	
7	0	1	3	3	1	2	0	0	0	3	1	0	1	0	0	0	0	0	2	0	0	2	1	0	123	09	
8	1	0	0	1	2	2	1	0	0	0	0	1	3	1	1	0	0	0	0	1	0	1	2	0	117	10	
9	2	0	5	1	1	0	1	0	0	2	2	1	1	0	0	0	0	1	4	0	0	0	0	0	101	11	
10	0	0	0	0	1	2	3	1	0	0	0	1	4	1	1	0	0	0	1	0	0	0	0	0	121	11	
11	0	0	1	1	1	1	2	1	0	0	2	1	2	1	0	0	0	0	1	0	0	0	1	0	125	11	
12	0	0	1	2	2	2	0	1	0	0	0	1	4	0	1	0	0	0	0	1	0	0	2	0	106	12	
13	0	0	0	4	2	2	2	0	0	1	0	1	2	1	1	0	0	0	0	0	0	2	0	0	121	09	
14	0	1	1	3	1	1	2	0	0	1	0	2	2	2	0	0	0	0	0	0	1	1	0	0	121	09	
15	1	1	1	2	1	3	2	0	0	0	2	2	3	1	0	0	0	0	0	0	1	2	0	0	117	12	
16	0	0	3	0	0	1	0	0	0	2	1	2	1	0	0	0	0	1	1	0	0	1	0	0	122	09	
17	0	0	4	3	2	0	0	0	0	2	1	0	1	0	1	1	0	1	1	0	0	0	1	2	121	10	
18	0	0	0	4	3	2	1	0	0	0	0	1	3	2	1	0	0	0	0	0	0	0	1	0	112	12	
19	0	2	0	3	2	1	1	0	0	0	1	0	5	1	0	0	0	1	0	0	1	2	2	0	114	12	
20	0	0	2	3	0	1	2	0	0	0	0	2	3	1	0	0	0	0	1	0	1	1	0	0	119	12	
21	0	0	1	0	0	3	2	0	0	1	0	2	2	2	0	0	1	0	0	0	1	2	0	0	111	10	
22	0	1	0	5	1	2	1	1	0	0	0	2	3	1	0	0	0	0	0	0	0	2	1	0	117	11	
23	0	0	0	4	1	3	2	0	0	0	1	1	2	2	1	0	0	0	1	0	0	1	1	0	114	11	
24	2	1	1	5	1	2	2	0	0	0	1	1	3	1	1	0	0	0	0	1	1	1	0	0	111	12	
25	0	1	1	3	2	2	2	1	0	1	0	0	3	1	1	0	0	0	0	1	1	1	0	0	111	10	
26	0	0	0	4	2	3	1	1	0	0	0	1	4	1	1	0	0	0	1	1	0	2	1	0	111	09	
27	0	0	0	7	1	3	0	0	0	0	0	0	1	4	0	0	0	0	0	1	0	2	1	0	111	11	
28	3	0	2	1	0	1	0	1	0	3	1	1	1	1	0	0	0	0	2	0	0	2	2	0	95	06	
29	0	0	2	2	1	3	0	1	0	0	0	1	4	0	1	0	0	2	1	0	1	1	1	0	110	11	
30	0	0	1	4	2	5	0	1	0	0	0	2	3	1	0	0	0	0	1	0	0	2	1	0	120	11	
31	0	0	2	4	2	3	0	1	0	2	2	1	1	1	0	0	0	0	0	1	1	1	0	0	112	11	
32	1	0	2	4	2	1	1	0	0	3	1	0	0	1	1	0	0	0	2	3	0	0	0	0	109	12	0
33	1	1	3	2	1	2	0	0	0	1	0	2	2	1	0	0	0	0	2	1	0	2	0	0	104	11	1
34	1	0	3	3	2	1	0	1	0	0	2	2	2	0	0	0	0	0	0	1	1	0	1	0	107	11	
35	1	2	3	2	0	2	0	0	0	2	1	2	0	1	0	0	0	0	2	1	0	3	0	0	128	11	0
Mean	0·31	0·40	1·31	3·43	1·31	2·71	0·91	0·21	0·0	0·86	0·60	1·14	2·57	0·91	0·49	0·0	0·00	0·37	0·23	1·14	0·57	0·46	1·46	0·11			
S.D.	0·72	1·23	1·35	1·25	0·75	1·45	0·97	0·41	0	1·73	0·71	0·68	1·22	0·73	0·55	0·0	0·00	1·07	1·83	1·35	0·72	1·07	0·84	0·78			
Sum	13	28	46	125	46	107	32	11	0	30	21	40	83	32	17	0	1	7	39	15	15	51	25	2			

Similarity scores, their intelligence quotients, and the absence or presence of stereotypy in their drawings.

A summary of the "t" tests made on the group means of consolidated scores is shown in Table 3.

TABLE 3

Summary of "t" Tests on Difference of Means

	Mean of C Group	Mean of A Group	S.D.	"t"	Sig. Level
Details	6.94	8.20	1.285	.982	N.S.
Proportion	4.84	5.00	.676	.236	N.S.
Perspective	1.74	2.65	.460	1.98	.05

It can be seen that there is no significant difference between the two groups on the Detail or the Proportion score but that there is a significant difference between them on the Perspective score. However, in consideration of the factor analysis to be discussed below it should be mentioned that this "significant" difference may be a statistical artifact.

The proportion of drawings judged as stereotyped in the two groups are compared in Table 4.

TABLE 4

Comparison of Groups on Stereotypy

Proportion of Stereotyped Drawings

A Group	8/35	(20.9%)
C Group	17/35	(48.6%)

The difference between these proportions was found by Edward's test (1960) to be significant at the 0.01 level.

In order to ascertain the structure of the scores, the data were programmed for a principal factor analysis. The resulting correlation matrix is reproduced in Table 5. It was factored by the principal axis method with unities in the diagonal. The program called for arbitrary choice of a number of factors and on the basis of the number of variables this number was set at six. These were rotated analytically to the Quartimax criterion. The rotated loadings are presented in Table 6 (the unrotated loadings and Eigen values are presented in Table 7). Interpretation of the factors will be considered in the discussion portion of this paper. Except for Factor I, which accounted for 19.9% of the total common factor variance, and for Factor III, which had a "doublet" which seemed to be related directly to the theory, the factors were largely uninterpretable, for interpretation was to be based on variables having rotated loadings of at least 0.30. It can be seen (Table 6) that most of the loadings are less than 0.30.

It should be noted (Table 6) that the criterion measure of abstraction, the Similarities sub-test, has the lowest communality of all the variables.[1]

1. Communality can be interpreted as that portion of the variable which has common variance with the other variables (Fruchter, 1954, p. 35).

TABLE 5

Intercorrelations among the variables

		1	2	3	4	5	6	7	8
Details	D_3 1	1.000	0.344	0.349	-0.403	-0.292	-0.452	0.004	0.058
	D_2 2	0.344	1.000	0.410	-0.526	-0.329	-0.544	-0.116	-0.164
	D_1 3	0.349	0.410	1.000	-0.726	-0.310	-0.525	-0.140	-0.139
	A_1 4	-0.403	-0.526	-0.726	1.000	0.238	0.317	0.073	0.005
	A_2 5	-0.292	-0.329	-0.310	0.238	1.000	0.197	-0.236	0.171
	A_3 6	-0.452	-0.544	-0.525	0.317	0.197	1.000	0.099	0.117
	S_1 7	0.004	-0.116	-0.140	0.073	-0.236	0.099	1.000	-0.080
	S_2 8	0.058	-0.164	-0.139	0.005	0.171	0.117	-0.080	1.000
Proportion	D_2 9	0.131	0.342	0.503	-0.409	-0.151	-0.367	-0.234	-0.178
	D_1 10	0.440	0.354	0.393	-0.236	-0.162	-0.398	-0.053	-0.001
	A_1 11	0.029	0.066	0.093	-0.080	-0.231	0.020	0.101	0.059
	A_2 12	-0.293	-0.375	-0.500	0.481	0.226	0.427	0.122	0.223
	A_3 13	-0.012	-0.246	-0.200	-0.009	0.109	0.172	0.367	-0.092
	S_1 14	-0.181	-0.249	-0.337	0.245	0.253	0.207	0.062	-0.052
	D_3 15	-0.052	0.331	0.248	-0.084	0.088	-0.230	-0.135	-0.068
	D_2 16	-0.048	0.276	0.159	-0.036	-0.045	-0.107	-0.237	-0.037
Perception	D_1 17	0.475	0.494	0.527	-0.528	-0.330	-0.328	-0.137	-0.020
	N_1 18	0.093	-0.043	0.160	0.053	0.005	-0.242	-0.106	-0.088
	N_2 19	-0.104	0.023	-0.033	0.037	0.037	-0.257	0.076	0.085
	N_3 20	-0.125	-0.147	-0.218	0.056	-0.013	0.396	0.011	0.055
	S_1 21	0.139	-0.078	-0.151	0.203	0.023	0.257	-0.079	0.106
	I.Q. 22	-0.289	-0.024	0.022	-0.023	0.004	0.214	-0.074	-0.161
	Sin 23	-0.156	-0.243	-0.129	0.155	0.227	0.186	0.060	-0.155
	ST. 24	0.071	0.414	0.184	-0.137	-0.087	-0.281	0.087	0.185

TABLE 5 (continued)

		9	10	11	12	13	14	15	16
	D_3 1	0.131	0.440	0.029	-0.293	-0.012	-0.181	-0.052	-0.048
	D_2 2	0.342	0.354	0.066	-0.375	-0.246	-0.249	0.331	0.276
	D_1 3	0.503	0.393	0.093	-0.500	-0.200	-0.337	0.248	0.159
	H_1 4	-0.409	-0.236	-0.080	0.481	-0.009	0.245	-0.084	-0.036
Details	H_2 5	-0.151	-0.162	-0.231	0.226	0.109	0.253	0.088	-0.045
	H_3 6	-0.367	-0.398	0.020	0.427	0.172	0.207	-0.230	-0.107
	S_1 7	-0.234	-0.053	0.101	0.122	0.367	0.062	-0.135	-0.237
	S_2 8	-0.178	-0.001	0.059	0.223	-0.092	-0.052	-0.068	-0.037
Proportion	D_2 9	1.000	0.381	-0.092	-0.698	-0.356	-0.208	0.167	0.092
	D_1 10	0.381	1.000	-0.095	-0.452	-0.330	-0.303	0.095	0.071
	H_1 11	-0.092	-0.095	1.000	-0.142	-0.060	-0.589	-0.179	-0.099
	H_2 12	-0.698	-0.452	-0.142	1.000	0.061	0.166	-0.168	-0.013
	H_3 13	-0.356	-0.330	-0.060	0.061	1.000	0.062	-0.162	-0.263
	S_1 14	-0.208	-0.303	-0.589	0.166	0.062	1.000	0.131	0.105
Perspective	D_3 15	0.167	0.095	-0.179	-0.168	-0.162	0.131	1.000	0.266
	D_2 16	0.092	0.071	-0.099	-0.013	-0.263	0.105	0.266	1.000
	D_1 17	0.350	0.264	0.141	-0.350	-0.200	-0.334	0.194	0.152
	H_1 18	0.242	0.125	-0.237	-0.150	-0.195	0.230	0.098	0.024
	H_2 19	-0.097	0.085	-0.058	0.019	0.002	-0.017	0.130	0.009
	H_3 20	-0.184	-0.234	0.160	0.234	0.109	-0.184	-0.246	-0.244
	S_1 21	-0.086	-0.064	0.076	0.277	-0.195	-0.129	-0.136	-0.076
	D_1 22	0.036	-0.045	-0.040	0.010	-0.129	-0.017	0.110	0.083
	S_{H_1} 23	-0.299	-0.165	-0.118	0.307	0.274	0.035	-0.123	-0.230
	S_T 24	0.272	0.430	0.136	-0.268	-0.291	-0.349	0.157	0.022

TABLE 5 (continued)

		17	18	19	20	21	22	23	24
	D_3 1	0.475	0.093	-0.104	0.125	0.139	-0.289	-0.156	0.071
	D_2 2	0.494	-0.043	0.023	-0.147	-0.078	-0.024	-0.243	0.414
	D_1 3	0.527	0.160	-0.033	-0.218	-0.151	0.022	-0.129	0.184
	N_1 4	-0.528	0.053	0.037	0.056	0.203	-0.023	0.155	-0.137
Details	A_2 5	-0.330	0.005	0.037	-0.013	0.023	0.004	0.227	-0.087
	A_3 6	-0.328	-0.242	-0.257	0.396	0.257	0.214	0.186	-0.281
	S_1 7	-0.137	-0.106	0.076	0.011	-0.079	-0.074	0.060	0.087
	S_2 8	-0.020	-0.088	0.085	0.055	0.106	-0.161	-0.155	0.185
Proportion	D_2 9	0.350	0.242	-0.097	-0.184	-0.086	0.036	-0.299	0.272
	D_1 10	0.264	0.125	0.085	-0.234	-0.064	-0.045	-0.165	0.430
	A_1 11	0.141	-0.237	-0.058	0.160	0.076	-0.040	-0.118	0.136
	A_2 12	-0.350	-0.150	0.019	0.234	0.277	0.010	0.307	-0.268
	A_3 13	-0.200	-0.195	0.002	0.109	-0.195	-0.129	0.274	-0.291
	S 14	-0.334	0.230	-0.017	-0.184	-0.129	-0.017	0.035	-0.349
Perspective	D_3 15	0.194	0.098	0.130	-0.246	-0.136	0.110	-0.123	0.157
	D_2 16	0.152	0.024	0.009	-0.244	-0.076	0.083	-0.230	0.022
	D_1 17	1.000	0.025	-0.194	-0.164	0.043	0.047	-0.283	0.175
	A_1 18	0.025	1.000	-0.088	-0.512	-0.180	0.058	-0.133	-0.216
	A_2 19	-0.194	-0.088	1.000	-0.220	-0.467	0.173	-0.101	0.207
	A_3 20	-0.164	-0.512	-0.220	1.000	0.360	-0.002	0.211	-0.087
	S_1 21	0.043	-0.180	-0.467	0.360	1.000	-0.115	0.147	0.028
	I 22	0.047	0.058	0.173	-0.002	-0.115	1.000	-0.006	0.028
	Sex 23	-0.283	-0.133	-0.101	0.211	0.147	-0.006	1.000	-0.339
	St 24	0.175	-0.216	0.207	-0.087	0.028	0.028	-0.339	1.000

TABLE 6
Rotated values of factor loadings
according to quartimax criteria

		COMMUNALITIES	1	2	3	4	5	6
	D_3 1	0.738	0.557	-0.079	0.027	0.118	-0.086	0.633
	D_2 2	0.684	0.669	0.147	0.174	-0.071	0.411	0.103
	D_1 3	0.683	0.810	-0.080	0.035	0.025	0.118	-0.066
	A_1 4	0.648	-0.777	0.112	0.124	0.034	-0.120	-0.026
	A_2 5	0.328	-0.511	-0.196	0.028	0.046	0.160	-0.027
	A_3 6	0.651	-0.598	0.267	-0.234	0.283	-0.119	-0.271
	S_1 7	0.460	-0.048	0.179	-0.231	-0.455	-0.359	0.193
	S_2 8	0.481	-0.293	0.167	0.435	0.034	0.043	0.419
	D_2 9	0.710	0.602	-0.335	0.311	0.185	-0.054	-0.319
	D_1 10	0.542	0.464	-0.204	0.499	-0.033	-0.092	0.162
	A_1 11	0.517	0.199	0.553	0.177	0.019	-0.354	-0.123
	A_2 12	0.677	-0.713	0.252	-0.171	0.085	0.164	0.205
	A_3 13	0.688	-0.100	0.138	-0.658	-0.371	-0.238	0.180
	S_1 14	0.671	-0.432	-0.522	-0.322	-0.070	0.312	0.077
	D_3 15	0.512	0.170	-0.127	0.078	-0.151	0.653	-0.106
	D_2 16	0.522	0.085	-0.048	0.113	0.058	0.700	-0.077
	D_1 17	0.620	0.704	0.110	0.065	0.216	0.223	0.108
	A_1 18	0.685	0.088	-0.811	0.056	0.074	-0.088	-0.056
	A_2 19	0.696	-0.106	0.024	0.274	-0.768	0.114	-0.079
	A_3 20	0.603	-0.187	0.614	-0.180	0.345	-0.182	-0.079
	S_1 21	0.701	-0.170	0.273	0.086	0.730	-0.056	0.231
	IQ 22	0.549	-0.029	0.068	0.024	-0.074	0.154	-0.717
	SIM 23	0.344	-0.235	0.078	-0.509	0.099	-0.118	0.002
	ST 24	0.674	0.235	0.265	0.705	-0.221	0.033	0.036
		14.386	4.773	2.252	2.186	1.881	1.755	1.539
	Percent of common variance extracted		19.9	9.4	9.2	7.8	7.3	6.6

TABLE 7

UNROTATED FACTOR MATRIX AND EIGEN VALUES

		COMMUNALITIES	1	2	3	4	5	6
Perspective Proportion Details	D_3 1	0.738	-0.522	-0.264	-0.225	-0.286	0.480	0.181
	D_2 2	0.684	-0.721	-0.069	0.067	0.070	-0.085	0.377
	D_1 3	0.683	-0.774	-0.048	-0.126	-0.166	-0.191	0.049
	A_1 4	0.648	0.665	0.193	0.236	0.130	0.219	-0.218
	A_2 5	0.328	0.403	0.324	0.223	-0.002	0.107	0.004
	A_3 6	0.651	0.702	-0.170	0.215	-0.082	-0.262	-0.092
	S_1 7	0.460	0.184	-0.191	-0.552	0.273	0.104	0.012
	S_2 8	0.481	0.114	-0.145	0.325	0.253	0.517	0.104
	D_2 9	0.710	-0.678	0.123	0.123	-0.179	-0.162	-0.401
	D_1 10	0.542	-0.621	0.001	0.061	0.088	0.313	-0.219
	A_1 11	0.517	-0.109	-0.611	0.014	0.268	-0.164	-0.181
	A_2 12	0.677	0.715	-0.045	0.203	0.051	0.140	0.318
	A_3 13	0.688	0.366	-0.121	-0.698	-0.004	-0.069	0.218
	S_1 14	0.671	0.383	0.641	-0.074	-0.243	0.113	0.188
	D_3 15	0.512	-0.309	0.427	0.197	0.092	-0.173	0.396
	D_2 16	0.522	-0.233	0.333	0.387	-0.004	-0.152	0.429
	D_1 17	0.620	-0.675	-0.223	0.070	-0.221	-0.085	0.230
	A_1 18	0.685	-0.191	0.566	-0.088	-0.354	0.196	-0.397
	A_2 19	0.696	-0.052	0.315	-0.182	0.746	0.032	0.055
	A_3 20	0.603	0.365	-0.616	0.162	-0.064	-0.239	0.054
	S_1 21	0.701	0.196	-0.481	0.489	-0.394	0.190	0.025
	IQ 22	0.549	0.017	0.198	0.186	0.194	-0.638	-0.172
	Sim. 23	0.344	0.432	-0.100	-0.228	-0.255	-0.146	0.095
	St. 24	0.674	-0.450	-0.174	0.281	0.572	0.172	-0.076
			14.386	5.389	2.574	1.852	1.779	1.520	1.272

EIGENVALUES

5.389	2.574	1.852	1.779	1.520	1.272	1.219	1.100	0.996	0.916
0.802	0.671	0.631	0.532	0.452	0.433	0.400	0.370	0.321	0.284
0.189	0.176	0.070	0.051						

CHAPTER IV

DISCUSSION

The results of the present study fail to confirm in its entirety the first general hypothesis put forward here. The capacity for abstract thinking does not allow the Abstract group when compared with the Concrete group to exhibit in their drawings an increase in the number and quality of details, nor an increase in the recognition of elements of proportion. However, the two groups differed as predicted in the use of perspective points. The results do support the second hypothesis that the higher proportion of the drawings of the Abstract group, when judged in terms of "global" quality, will express a higher proportion of a "stereotyped" man.

The first obvious question arising from the results is why the Abstract and Concrete groups were not significantly different from each other when measured on the detail and proportional aspects of the drawing but were significantly different from each other only on the perspective measures of the scale.

The first point to be considered in the discussion will be the earlier noted low factorial communality of the Similarities sub-test score (Table 6). Essentially, it means this score is little related to any of the drawing variable scores in that it has negligible common variance with them. This is somewhat unexpected not only because, theoretically, the opposite was predicted but also because it has

been shown elsewhere (Digiammo and Ebinger, 1961) that a measure of verbal abstraction was associated significantly with the H-T-P scores as applied to human figure drawings. In their work, Digiammo and Ebinger obtained Rho's between Proverbs and total "good" scores of 0.65 and between Proverbs and total "flaw" scores of 0.55.[1] A consideration of the correlation matrix (column 23 of Table 5) does indicate, that in a very general way the correlations of abstraction with the drawing scores are compatible with the results of Digiammo and Ebinger. That is, in general, the "good" scores correlate positively with the Similarities test and the "flaw" scores correlate negatively with it. However, the correlations are very small when individual differential items are considered, (for example, D3, D2, etc) and they do not always occur as expected. For example, one would expect the "good" scores A1, A2 and S1 items of Perspective to have positive correlations with the Similarities test for these even more than the items on Details and Proportion deal with abstractive relationships (Buck, 1948) yet, they have negative correlations. The latter casts some doubt on the validity of the Buck method for scoring human figure drawings as a measure reflecting abstractive capacity. It is true that, in scanning Table 5, the preceding signs of the correlations support the rationale for the test structure. "Good" scores usually correlate positively with other "good" scores and negatively with "flaw" scores; similarly, "flaw" scores correlate

1. Digiammo and Ebinger (1961) reflected the "flaw" scores which ordinarily carry a negative sign in order to obtain the positive correlation.

positively with other "flaw" scores, and negatively with "good" scores. However, it is apparent that the majority of inter-correlations between individual variables of the drawing tests are too small to be significant.

As well, there is some evidence that the scale lacks consistency. Table 6 indicates that at least one factor emerged which was fairly common to all the variables. A number of differential items of the drawing scale load on the first factor almost to the limit of their communalities (for example, D2 and A1 of Details, and A2 of Proportion). Yet a number of other items of drawing in the same intuitively grouped clusters do not load on the factor at all (for example, D2 and A1 of Perspective). Such a situation suggests the individual items chosen in construction of the Buck scale and which are assumed to be measuring the same things are not consistently tapping a common factor. The most striking example occurs within the differential items included in the Perspective division of the scale. Here, only one variable (D1) has a meaningful loading on the common factor. In general, this indicates the Perspective scores do not tap the same common factor as do the Detail and Proportion scores. As well, the loading of the Similarities variable on the factor is negligible. This indicates the obtained "significant" t for the difference between the two groups on the Perspective part of the scale is an artifact.

Although only two of the factors were interpretable, some knowledge has been gained about what may be entering into the structure of drawing and Similarities scores. Factor I (Table 6) is quite a large

factor which accounts for 19.9% of the common variance among the scores. The drawing scores that load on this factor with positive loadings are "flaw" scores and the scores that load on this factor with "negative" loadings are "good" scores. One possibility that is open, then, is that the factor may represent a general dimension of drawing ability in terms of psychomotor competence in responding to the directive "draw a man". That is, a person is able to communicate by drawing a reasonable representation of images of persons that have been assimilated in his mind. Or, if one looks at the particular items involved, in the "flaw" scores these include: "eyes not shown", "transparency of a part of the body", "crude clothing" and in the "good" scores: "fluidity, "profile", "animation". These and similar items have frequently been related to some aspect of psychological adjustment when the drawing is considered as a projective test of the self.[1] From this viewpoint, the factor may

1. A theoretical basis for figure drawing as a projection of the self comes from self-image psychology and the psycho-analytic school of projection. A physiological and psycho-analytical basis for "body image" was first set forth by Schilder (1935). His viewpoint states that the body configuration is seen as a gestalt formed from the many physical organic sensations and the reactions of others to oneself that one notes. Snygg and Coombs (1949) present a psychological self-image theory. They contrast the so-called "objective" reality with the significance of the world as it is perceived, and concluded that it is the subjective world that has meaning. This meaning would depend, to a large extent, on the individual's capacity to assimilate new stimuli.

   Further, because there is much empirical evidence to indicate that central or cognitive factors appear to be crucial in determining features of drawing the meaning should be apparent in drawings.

represent a broad dimension of psychological adjustment so that, if abstract thinking has helped in the adjustment of the individual in the past, it will be evident in his portraying of a good drawing. Of course, another interpretation may be that both dimensions, general drawing ability and broad psychological adjustment, may be reflected in the factor. Both possibilities have been suggested as underlying variables in the drawings of human figures and Levy, Lomax, and Minsky (1963) and Whytmyre (1953) have shown that artistic excellence correlates positively with evaluation of adjustment by clinicians from drawings. In addition, Martin and Damrin (in Harris, 1963) have applied factor analysis to drawings and designated one factor as Maturity; and Lark-Horowitz (in Harris, 1963) has reported a Developmental factor. Both of these may represent a psychological component. As well, factors relating to formal elements of drawing were isolated in each study.

A tentative interpretation of Factor III must consider the appreciable positive loading on stereotypy and the appreciable negative

> That distortions in drawing may be literal or symbolic representation of inadequacies or distortions in the artist's self-image is the theory for the Machover draw a person technique (1949) and for Buck's House-Tree-Person test (1948) When an individual attempts to solve the problem of the directive to draw a person he is compelled to extract from some source. The individual must draw consciously, and no doubt unconsciously, upon his whole system of psychic values. The body, or the self, is the most intimate point of reference for any activity. This investment in body organs, or the perception of the body image as it has developed out of personal experience must, somehow, guide the individual who is drawing in the specific structure and content which constitutes his offering of a "person". (Machover, 1949, p 5)

loading on the Similarities Test (Table 6). Broadly, this may suggest that a person with simple verbal concepts forces his experience into borrowed abstractions, or "stereotypes". This interpretation of the factor gains further import when it is remembered that the comparisons for proportion of stereotyped drawings was significantly different for both groups. These results imply that in individuals whose verbal concepts are not highly developed the drawing of human figures will also inadequately express their images and their response will be made only to one vivid schema, that is, stereotypy. As their conceptual thoughts develop, so does their organization and concomitantly the representation of their images becomes more real, more 'average' in the drawings. Language development and use have been related to good drawing performance before (Shirley & Goodenough, 1932). In Harris (1963) Read describes how as a child acquires the machinery of thought the vividness of his imagery decreases and the realism of his drawing increases; Eng (in Harris, 1963) suggests that as a child's concepts become more differentiated his drawings rely less on a formula he has previously used.

Before the conclusions are cited, note should be made of one interesting trend that emerged in the data even though that trend was not close to being statistically significant. Tables 1 and 2 illustrate that though the Concrete group tended to do more poorly than the Abstract group in that they obtained more "flaw" scores as expected, some aspect of functioning allowed them to also do slightly better in

terms of the "very good" scores on Details and Proportion. Pertinent, here, is a statement by Gardner and Schoen (1962, p. 19) that although capacity to abstract is important to the individual's concept formation there are other characteristic cognitive organizations which may be employed for control by subjects in a particular situation. It is speculated that such may have happened. The directions "draw a man" by their very nature may force some subjects, regardless of their normal approach, to act upon awareness of distinctions between "men". It is conceivable that when Ss know what is required before responding they attend to relevant stimuli. Research could point to investigating more specific cognitive controls that are important in drawing.

Conclusions

1. A relationship between the WAIS Similarities test (a verbal abstraction measure) and performance in drawings of human figures (as scored by the Buck House-Tree-Person method) has not emerged when the drawings are judged for differential items such as Details, Proportion and Perspective. Indeed, the whole range of the Similarities score has negligible common variance with the drawing variable scores.
2. When the proportion of drawings judged as stereotyped in the two groups was compared, it was found that the Concrete group drew a significantly greater number of "stereotyped" drawings.
3. Evidence from the factor analysis has indicated that the Buck

scale lacks consistency. Particularly, the Perspective scores do not tap the same common factor as do the Detail and Proportion scores.

4. Two factors were interpreted. One, the common factor, was suggested to be a dimension of drawing ability in conjunction with a dimension of broad psychological adjustment. The second, not named, was interpreted to suggest persons with simple verbal concepts force drawings to conform to formula or "stereotypes".

5. It is suggested further research in drawing would need to investigate more specific cognitive controls that are important in drawing.

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APPENDIX A

Reproduction of Similarities Sub-test

TASK A

In the list below you will find two things which are the same or alike in certain ways. You are requested to write down in what way they are alike.

For example: "In what way are an orange and a banana the same?"

For this you might say: "You can eat them both" or "They both have skins" or "They are both fruits".

They are alike in these ways. Write down ONE way in which they are alike.

1. In what way are an orange and a banana the same?
2. In what way are a coat and a dress the same?
3. In what way are an axe and a saw the same?
4. In what way are a dog and a lion the same?
5. In what way are north and west the same?
6. In what way are eye and ear the same?
7. In what way are air and water the same?
8. In what way are table and chair the same?
9. In what way are egg and seed the same?
10. In what way are poem and statue the same?
11. In what way are wood and alcohol the same?
12. In what way are praise and punishment the same?
13. In what way are fly and tree the same?

APPENDIX B

Reproduction of H-T-P Scoring Method

PERSON

Details

:
Eyes not shown D3
Incorrect number of eyes (as 2 head in full profile or 1 with in full-face) D2
Eyes shown by dots, hollow circles, squares, or horizontal lines h only one line needed for each A1
Eyes shown with 2-dimensional et, and the pupils indicated by or circles (or, as by implication, the eyes hidden by a hand) A3
.—Do not score at all if the head awn so that only its back can be

:
not shown D3
shown by a single, straight verline or a single dot (with the drawn full-face) D2
shown as a triangle, an oval, a re, or a circle D1
shown (in full-face) by two circles, or ellipses, or 2 unjoined vertical lines; by a < (in profile) A1
(5) Nose shown as conventionally two-dimensional (as by two vertical, parallel lines joined at the bottom, or one vertical line curving at its lower end) A2
(6) Definite "flaring" of nostrils in a conventional 2-dimensional nose S1
Note.—Do not score at all if the head is drawn so that only its back can be seen.

302: *Mouth:*
(1) Mouth not shown D3
(2) One-dimensional mouth (one thin horizontal line only: reshading is construed as implying 2-dimensional intent and is not to be scored D1). D1

303: *Chin:*
(1) Indicated in full-face by distinct and careful lineation. The chin must be clearly defined for credit to be given here S1
Note.—This item is not to be scored leniently.
(2) Chin indicated clearly with head in profile A1
(3) Mandibular line shown with the head in profile: that is, the "jaw line" is continued horizontally or obliquely toward the back of the head and is more than a mere continuation of the chin-into-neck line S2

304: *Ears:*
(1) Ears not shown D1
Note: Do not score here if the Person drawn is a female and the hair on her head is so drawn that the ears—even if presented—could not be seen because of the hair.
(2) Ear convolutions shown clearly (a simple dot or circle will not suffice) .. A3

305: *Hair:*
(1) No hair shown anywhere on the head or face D2
Note.—Don't score if position of hat may be presumed to hide the hair.
(2) Hair shown in more than one place on the head, as by eyebrows (or eyelashes) and hair on top of the head, or by eyebrows and mustache, or by any other combination involving the head A2
Note.—If the person is drawn full-face *both* eyebrows must be shown for A2 credit.

306: *Neck:*
(1) No neck shown D2
Note.—Do not score if the neck is wrapped in a scarf, for instance.
(2) One-dimensional neck D1
(3) Two-dimensional neck A1

307: *Trunk:*
(1) No trunk shown D3
(2) One-dimensional trunk (as in a "stick-man") D2
(3) Two-dimensional trunk (circular, oval, triangular, or box-like in shape) D1
(4) Two-dimensional trunk of conventional shape A1

308: *Shoulders:*
(1) No shoulders shown (or trunk is 1-dimensional, circular, oval, triangular, or box-like in shape) D1
(2) Shoulders drawn (in full-face presentation credit only if *both* are drawn) A1
Note.—To be credited only when there is an obvious rounding from the horizontal downward into the perpendicular (for the lateral margin of the trunk) in full or partial full-face presentation; in profile presentation the uppermost margin of the arm must approximate the base of the neck line.

309: *Arms:*
(1) No arms shown D3
(2) Incorrect number of arms shown whether 1-dimensional or 2-dimensional, and presence of one arm only not verbally and logically accounted for D3
Note.—Only one arm need be shown if the Person is presented in profile, of course.
(3) One-dimensional arms D2

310: *Hands:*
(1) Mitten-like, bar-like, or circular hands without fingers D2
(2) Mitten, bar-like, or circular hands with one-dimensional fingers D1
(3) Two-dimensional wrist clearly shown by the width of the forearm at the wrist end being narrower than at the elbow and then widening towards the fingers, or a joint indicated by a change in direction of the long axis of a 2-dimensional forearm at the appropriate point A3
Note.—Score A3 if the subject draws his Person so that the Person has his hands in his pockets, or has his hands behind his back, for example. The examiner should ask (in case of doubt) if the hand is gloved.

311: *Fingers:*
(1) No fingers shown D3
(2) One-dimensional fingers, but an improper number shown (as six, for instance) D2
(3) One-dimensional fingers of proper number shown actually or by implication (as with the hand partly in a pocket) D1
(4) Two-dimensional fingers shown, but in improper number D2
Note.—To be scored 2-dimensional, the length of the finger must exceed its breadth.
(5) Two-dimensional fingers shown in proper number. This is to be credited if the hand is drawn at such an angle that *all* fingers cannot be seen, but the finger (or fingers) visible is 2-dimensional A2

Note.—Score A2 if the Person is drawn with the hands in pockets or a muff, or with hands behind the back, etc.

(6) Thumb shown as distinct from the other fingers A3
Note.—Credit if a straight line drawn across the proximal ends of the other four fingers will pass distally to the proximal end of the supposed thumb. Do not score if such a line intersects thumb's proximal end or passes proximally to it.

312: *Elbows:* Elbow joint indicated clearly either by flexion of a 2-dimensional arm (and the whole arm must be more than a single ellipse) at the proper point or by careful outlining of the joint, if the arm is not flexed A3

313: *Legs:*
(1) No legs shown D3
(2) Incorrect number of legs whether one- or two-dimensional and absence of a leg not logically accounted for verbally D2
Note.—One leg suffices if the Person is drawn in full profile, of course.
(3) One-dimensional legs D2

314: *Knee Joint* presented either by actual flexion of the leg at the proper point or by a recognizable outlining of the joint S1
Note.—Do *not* credit for one-dimensional leg.

315: *Feet:*
(1) No feet shown D3
Note.—Do *not* score if toes are shown, even though they merely project from the leg.
(2) One-dimensional feet, or 2-dimensional feet with incorrect number of toes D2
(3) Golf-club-head, oval, or square feet without heel D1
(4) Heel clearly shown if foot drawn in profile, or the correct number of 2-dimensional toes shown (or shoe clearly outlined) if foot drawn pointing anteriorly A1
Note.—Score A1 if the feet are hidden by a long evening gown, or, for example, by a table at which the Person is sitting.

316: *Clothing:*
(1) No clothing shown at all, and no sexual organs drawn to indicate that presentation in the nude was intended D2
(2) Clothing suggested (as by shading; by a bottom trouser—or a bottom dress-line; by a belt, by a hat, or by a row of buttons), but neither the trousers nor the dress is satisfactorily outlined throughout D1
(3) Minimum conventional clothing shown (trousers for a male; dress for a female) and/or more complete clothing suggested A1
(4) Person either nude with sexual organs drawn, or well clad; there must be a coat or a shirt *and* trousers, *and* shoes for the male; a dress *and* shoes for the female; (the shoe, incidentally, must be fully outlined, unless hidden as by a dress of floor-sweeping length) A3
Note.—The unclad Person drawn in profile may be presumed, in certain instances (as with the back partly turned toward the viewer), to have adequate sexual characteristics by implication—but before allowing credit the examiner should satisfy himself as to the subject's intent; in full-face presentation *all sexual organs* must either be drawn or be concealed by other parts of the body.

317: *Additional Details* such as a cane, a basket, a pair of roller skates S1
Note.—The essential thing is that the object be relevant to and "tie-in" with whatever the Person drawn *may be* (sword for soldier, for instance), *or may be doing* (horse for Person riding, for example).

Proportion

318: *Facial Inter-part Proportion:*
(1) Less than 3 of the following points positive: that is, eyes and mouth of greater width than height and ears and nose of greater height than width D1
Note.—If the Person is drawn with the head in profile, and the eye shown is more than a mere dot, the width of the eyes and mouth may be assumed to be greater than their height. And if the hair on top of the head is drawn in sufficient profusion to cover the ears, the unseen ears may be assumed to have greater height than width.
(2) Three plus: That is, any 3 of the above proportional requirements are met A1
(3) Four plus: That is, all of the above proportional requirements are met .. S1

319: *Head Proportion:*
(1) Face (in full-face presentation) an oval whose horizontal measurement is greater than its vertical, or a face in profile with the vertical dimension markedly exceeding the horizontal, or vice versa D1
(2) Face (in full-face presentation) a circle or almost square A1
(3) Face (in profile) with the vertical and horizontal measurements approximately equal A2
Note.—"Vertical" = tip of chin to top of forehead; "horizontal" = centre of forehead to occipital bulge.
(4) Face (in full-face presentation) a vertical oval A3

320: *Arms:*
(1) Forearms (one or both) wider than upper arm D2
Note.—To be scored leniently—not for minute differences.
(2) Arm Taper: The forearm is narrower than the upper arm. If both arms are shown, *both* must taper to secure credit A2

321: *Leg:*
(1) Lower leg's width is greater than that of the upper leg D2
(2) Satisfactory leg taper from thigh to ankle. This is to be scored only if a sufficient portion of the *unclad* leg indicates good taper. If both legs are presented, both must taper to secure credit A2

322: *Dimensional Scatter Between the Extremities:*
(1) Two-dimensional arms with one-dimensional legs D2
(2) One-dimensional arms with two-dimensional legs D2

323: *Ratios:*
I. *Face-trunk ratio* as to width (with the Person in *full-face*)
(a) Trunk's width less than that of the face D2
(b) Trunk's width approximately that of the face D1
Note.—The width of the face and the trunk is the greatest horizontal measment of each.

II. *Head-trunk ratio:* (as to height)
The head measurement is taken from the tip of the forehead to the lowest point of the chin with the mouth closed (if the mouth is drawn as open, the point should be approximated); the trunk measurement is taken from the lowest point of the chin to the top of the pelvic crest (in Persons drawn clothed, this will be at approximately the lower margin of the belt; in Persons drawn nude, it will be slightly above the hip joint).
(a) H:T: :1:3 or more, *or* T:H: :1:1 plus D1
(b) H:T: :1:2 or more but less than 3, *or* H:T: :1:1 or more but less than 1½ A1
(c) H:T: :1:1½ or more but less than 2 ..... A2
Note.—The ratios under (a) mean that the trunk measurement is 3 times that of the head, *or* the head measurement is greater than that of the trunk. The ratio under (c) means that the measurement of the trunk is at least one and one-half times that of the head, but not quite two times that of the head.

III. *Arm-trunk ratio:* (long axis dimension)
If the arms are of unequal length, take the dimension of the longer arm (the *arm dimension* is the distance from the tip of the shoulder to the point of the finger farthest therefrom):—
(a) T:A: :1:2 or more, *or* A:T: :1:1 plus D2
(b) T:A: :1:1½ or more, but less than 2 ..... D1
(c) T:A: :1:1 or more, but less than 1½ A2

IV. *Trunk-leg ratio:* (long axis dimension)
If the legs are of unequal length, take the dimension of the longer leg (the *leg dimension* is the distance from the tip of the pelvic crest to the point of the foot farthest therefrom):—
(a) T:L: :1:4 or more, *or* L:T: :1:1 plus D2
(b) T:L: :1:2 or more, but less than 4 ..... D1
(c) T:L: :1:1 ..... A2
(d) T:L: :1:1 plus, but less than 2 ..... A3
Note.—In a very poorly drawn Person it may be impossible for the examiner to determine the pelvic crest's location without asking the subject where the hip joint of his Person is: the pelvic crest would be a trifle above that point. If the pelvic crest's position cannot be determined even by questioning, do not score the ratios involving the trunk's long axis dimension.

Perspective

324: *Arm to Trunk Attachment:*
(1) Arm-trunk attachment segmental, as if the arms were drawn separately from the trunk, then glued on; there is, in short, no appearance of continuation of the shoulder line into the arm. One-dimensional arms are *always* to be considered segmentally attached D1
(2) Both arms springing from a common or nearly common source D1
(3) "Ribbon attachment" of arm or arms to trunk: in such instances the arm looks as if it had been squeezed out of the trunk much like a ribbon of toothpaste from a tube; there is almost always a marked widening of the arm as it leaves the trunk A1
(4) Complete "fluidity" of arm-trunk attachment: there is a continuation of the upper shoulder line into the outer arm line; in short, the arm becomes an actual extension of the shoulder. (If both arms are shown, both must have fluid attachment to secure credit here) A3

325: *Malplacement of Arms:*
(1) Arm or arms attached to the head or the neck D2
(2) Arm or arms attached to the trunk definitely below the shoulder level .. D1
Note.—If both types of presentation are employed score D2.

326: *Position of Arms:*
(1) *With body presented in full-face:*
(a) Both arms extended laterally and approximately at right angles or greater to the trunk .. D1
(b) One or both arms extended laterally at less than right angles to the trunk, but not straight down at the sides A1
(c) One or both arms straight down at the sides of the body A2
(d) With one or both arms (2-dimensional) flexed S1
Note.—If two types of depiction are employed, credit for the type bearing the higher factor rating.
(2) *With body presented in profile:*
(a) Arm or arms extended forward or backward and/or upward D1
Note.—If one arm is extended pointing toward something, score A3.
(b) Arm or arms extended forward or backward, but at less than right angles to the trunk A1
(c) Arm or arms hanging straight down at side A2
(d) Arm or arms (2-dimensional) with elbow flexed S1
Note.—If two types of depiction are employed, credit for the type bearing the higher factor rating.

327: *Finger Attachment:*
(1) More than one finger shown protruding from the side of the arm D2
(2) Fingers shown protruding from end of forearm D1
Note.—Do not score 327 if any recognizable attempt to produce a hand has been made.

328: *Mal-attachment of the Legs:* One or both legs attached to the head or the neck of the Person or joined to the trunk in some definitely abnormal fashion D3

329: *Placement of the Person on the Page:*
I. "Paper-chopped" (a margin of the page "chops" off some portion of the Person) D2
II. *Vertical Disparity:*
(a) 2 inches or greater D1
(b) 1 inch to less than 2 inches A1
(c) Less than one inch A3
Note.—By "vertical disparity" is meant the difference between the distance from the top margin of the page and the uppermost point of the Person's skull (*not the hat*) and the distance from the bottom margin of the page to the point of the Person's foot nearest the page's bottom.
Note.—Do not score this item if the subject has turned the form page so that the long axis of the page as first presented no longer pertains.

330: *Method of Presentation of Person:*
(1) Head drawn in profile; body in full-face A2
(2) Full or partial profile for both face and body A3

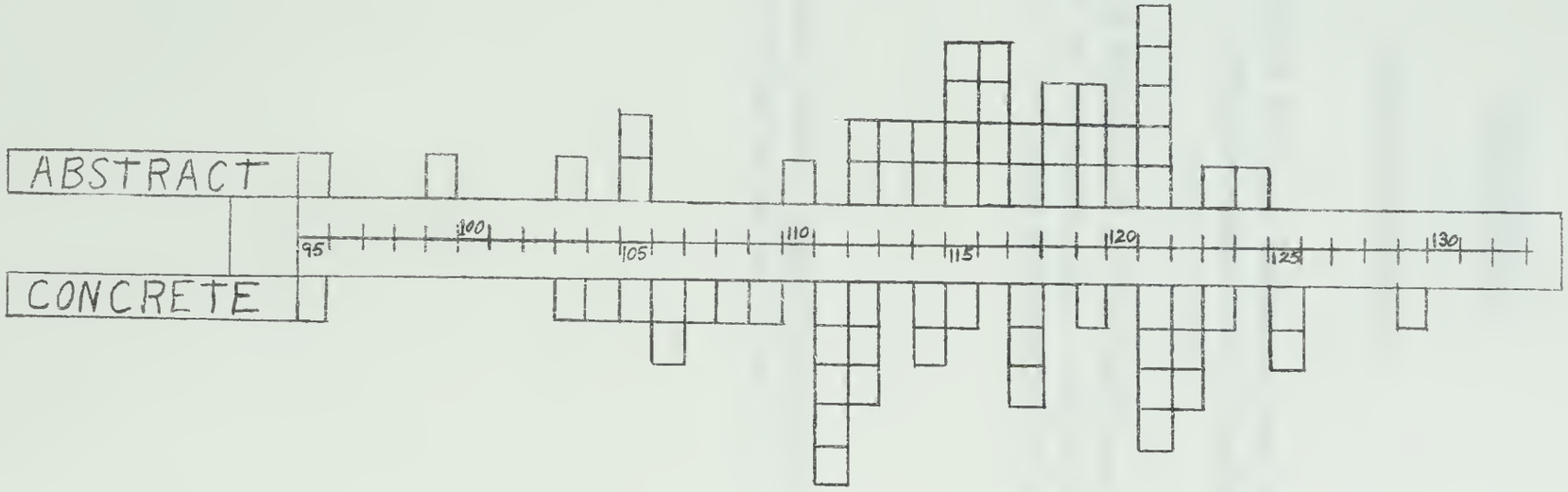
331: *Animation of Person:* Figure engaged in doing something besides standing still (sitting, walking, running, riding, throwing, or writing, for example) S1

332: *Type of Person:*
I. Person not recognizable as of the sex specified by the subject in his post-drawing (induced) comments, or the subject cannot or will not specify the sex D2
II. Person recognizable as of an age markedly different from that specified by the subject in his post-drawing (induced) comment D2
Note.—This particular point must be appraised most leniently lest the examiner find himself estimating artistry rather than concept.

333: *Transparency* of a part of the body or the clothing: score once for *each* "transparency" of body or clothing, *except* for a pair of shoes lacking complete "top lines," which is counted as one transparency only D1
Transparency is defined as the inability of an exterior or superimposed substance or object to conceal or cover, actually or in effect, that which is conventionally perceived as beneath or behind it and, therefore, concealed by it.

APPENDIX C

Distribution of Intelligence Quotients over Experimental Groups



APPENDIX D

INSTRUCTIONS

During this study class you are asked to perform three special tasks. The reason for this will be explained to you when you have finished.

Follow carefully the directions at the beginning of each sheet. When you finish one sheet go on to the next. Be certain to complete all that is required of you. You have approximately one-half hour in which to finish.

Part I: Do Task A.

When you have finished part I, signal by raising your hand and instructions will be given to you for parts II and III.

APPENDIX E

INSTRUCTIONS - continued

Part II:

On the blank piece of paper and with the pencil provided draw a man. After, print your name on the lower left hand corner on the back of the drawing and leave it face down on the desk.

Part III:

Do task B when you have finished part II.

APPENDIX F

Figure 1 - drawing judged to be stereotyped

Figure 2 - drawing judged to be not stereotyped

Figure 3 - drawing which obtained a low score

Figure 4 - drawing which obtained a high score

Figure 1

Figure 2

Figure 3

Figure 4